Claims 36-39

New claims 36 and 37 are supported in the specification at ¶0035.[1] New claim 38 is supported at ¶0024.

New claim 39 is merely a method claim corresponding to claim 1, but further reciting that the third underlayer is deposited "without deliberately adding boron...." Claim 39 is patentable for at least the reasons as allowed claims 26 and 28. (The Examiner has previously indicated that claims in which the third underlayer lacks boron are allowable.)

As claims 1-24, 26, 28, 30, 33 and 35-39 distinguish over Wong and Kanbe, Applicants earnestly request that the Application be allowed. If the Examiner's next action is other than allowance, the Examiner is respectfully requested to telephone Applicants' attorney at (408) 732-9500.

Respectfully submitted,

Kenneth E. Leeds
Reg. No. 30,566
Attorney for Applicants

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on September 22, 2006.

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Date

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[1] ¶0035 says that the boron content of the third underlayer should not be so much as to degrade noise or grain size control. As explained in Table V, the third underlayer affects SNR, i.e. signal to noise ratio.

EXHIBIT A

1. (Previously presented) A magnetic recording medium comprising:

a substrate;

a first bcc underlayer formed on said substrate;

a second bcc underlayer formed over the first underlayer, said second underlayer comprising boron;

a third bcc underlayer substantially lacking boron formed over the second bcc underlayer; and

a magnetic alloy data recording layer.

2. (Original) Medium of claim 1 wherein said first, second and third underlayers comprise bcc Cr alloys, and the magnetic alloy data recording layer comprises a hcp Co alloy.

3. (Previously presented) Medium of claim 2 wherein said first underlayer substantially lacks boron.

4. (Previously presented) A magnetic recording medium comprising:

a substrate;

a first bcc underlayer formed on said substrate;

a second bcc underlayer formed over the first underlayer, said second underlayer comprising boron;

a third bcc underlayer formed over the second bcc underlayer; and

a magnetic alloy data recording layer,

wherein said first, second and third underlayers comprise bcc Cr alloys, and the magnetic alloy data recording layer comprises a hcp Co alloy,

and wherein said first and third underlayers comprise less than 1% boron.

5. (Original) Medium of claim 1 wherein said boron in said second underlayer causes grain separation in said magnetic alloy data recording layer.

6. (Original) Medium of claim 1 wherein said boron in said second underlayer causes a reduction in grain size in said magnetic alloy data recording layer.

7. (Original) Medium of claim 1 wherein said boron reduces noise in said magnetic recording medium.

8. (Original) Medium of claim 1 further comprising a nucleation layer formed between said third underlayer and said magnetic alloy data recording layer.

9. (Original) Medium of claim 1 further comprising an amorphous metallic layer between said substrate and said first underlayer.

10. (Original) Medium of claim 1 further comprising a coupling layer formed on said magnetic alloy data recording layer and a second magnetic layer formed on said coupling

layer, wherein said magnetic alloy data recording layer and said second magnetic layer are antiferromagnetically coupled to one another.

11. (Original) A magnetic disk drive comprising the magnetic recording medium of claim 1.

12. (Previously presented) A magnetic recording medium comprising:

a substrate;

a first underlayer comprising Cr formed on said substrate;

a second underlayer comprising Cr and at least one additive formed on said first underlayer;

a third underlayer comprising Cr formed on said second underlayer, said third underlayer having a bcc crystal structure and substantially lacking boron; and

a magnetic alloy data recording layer formed on said third underlayer, said additive causing grain separation in said magnetic alloy data recording layer.

13. (Previously presented) Medium of claim 12 wherein said first and second underlayers have a bcc crystal structure and said magnetic alloy data recording layer comprises a hcp Co alloy, and said first and third underlayers substantially lack said additive.

14. (Original) Medium of claim 12 wherein said additive reduces noise and grain size in said magnetic alloy data recording layer.

15. (Original) Medium of claim 12 further comprising a nucleation layer formed between said third underlayer and said magnetic alloy data recording layer.

16. (Original) Medium of claim 12 further comprising an amorphous metallic layer between said substrate and said first underlayer.

17. (Original) Medium of claim 12 further comprising a coupling layer formed on said magnetic alloy data recording layer and a second magnetic layer formed on said coupling layer, wherein said magnetic alloy data recording layer and said second magnetic layer are antiferromagnetically coupled to each other.

18, (Original) A magnetic disk drive comprising the magnetic recording medium of claim 12.

19. (Previously presented) A magnetic recording medium comprising:

a substrate;

a first underlayer comprising Cr formed on said substrate;

a second underlayer comprising Cr and at least one additive formed on said first underlayer;

a third underlayer comprising Cr formed on said second underlayer, said third underlayer having a bcc crystal structure, said third underlayer substantially lacking boron; and

a magnetic alloy data recording layer formed on said third underlayer, said additive causing grain size reduction in said magnetic alloy data recording layer.

20. (Previously presented) Medium of claim 19 wherein said first and second underlayers have a bcc crystal structure and said magnetic alloy data recording layer comprises a hcp Co alloy, and said first and third underlayer substantially lack said additive.

21. (Original) Medium of claim 19 further comprising a nucleation layer formed between said third underlayer and said magnetic alloy data recording layer.

22. (Original) Medium of claim 19 further comprising an amorphous metallic layer between said substrate and said first underlayer.

23. (Original) Medium of claim 19 further comprising a coupling layer formed on said magnetic alloy data recording layer and a second magnetic layer formed on said coupling layer, wherein said magnetic alloy data recording layer and said second magnetic layer are antiferromagnetically coupled to each other.

24. (Original) A magnetic disk drive comprising the magnetic recording medium of claim 19.

25. (Canceled)

26. (Currently amended) Magnetic recording medium of claim 1 wherein said third bcc underlayer lacks boron.

27. (Canceled)

28. (Currently amended) Magnetic recording medium of claim 12 wherein said third underlayer lacks boron.

29. (Canceled)

30. (Previously presented) A magnetic recording medium comprising:

a substrate;

a first underlayer comprising Cr formed on said substrate;

a second underlayer comprising Cr and at least one additive formed on said first underlayer;

a third underlayer comprising Cr formed on said second underlayer, said third underlayer having a bcc crystal structure; and

a magnetic alloy data recording layer formed on said third underlayer, said additive causing grain separation in said magnetic alloy data recording layer, wherein the content of boron in said third underlayer is less than 1%.

31. (Canceled)

32. (Canceled)

33. (Previously presented) A magnetic recording medium comprising:

a substrate;

a first underlayer comprising Cr formed on said substrate;

a second underlayer comprising Cr and at least one additive formed on said first underlayer;

a third underlayer comprising Cr formed on said second underlayer, said third underlayer having a bcc crystal structure; and

a magnetic alloy data recording layer formed on said third underlayer, said additive causing grain size reduction in said magnetic alloy data recording layer, wherein the content of boron in said third underlayer is less than 1%.

34. (Canceled).

35. (Previously presented) Magnetic recording medium of claim 19 wherein said third underlayer lacks boron.

36. (New) Magnetic recording medium of claim 1 wherein the boron in said third bcc underlayer, if any, is of insufficient concentration to degrade the SNR.

37. (New) Magnetic recording medium of claim 1 wherein the boron in said third bcc underlayer, if any, is of insufficient concentration to degrade grain size control.

38. (New) Magnetic recording medium of claim 1 wherein said magnetic alloy comprises a $11\bar{2}0$ hcp Co alloy.

39. (New) A method for manufacturing a magnetic recording medium comprising:

depositing a first bcc underlayer formed on a substrate;

depositing a second bcc underlayer over the first underlayer, said second underlayer comprising boron;

depositing a third bcc underlayer substantially lacking boron over the second bcc underlayer, said depositing of said third bcc underlayer being accomplished without deliberately adding boron to said third bcc underlayer; and

depositing a magnetic alloy data recording layer.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Malhotra et al.

Title: Magnetic Recording Medium Having Novel Underlayer Structure

Serial No.: 10/761,820 Filed: January 21, 2004

Examiner: Holly C. Rickman Art Unit: 1773

Docket No.: K2003010

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

SECOND DECLARATION OF GERARDO BERTERO

I, Gerardo Bertero, Declare:

1. I am the same Gerardo Bertero who executed a declaration on August 11, 2006 ("Declaration") that was submitted in the present application ("Application").

2. I understand that the Examiner stated:

> It is noted that the B in Kanbe is added to a Cr **alloy** system containing any one of a number of other elements from which one of ordinary skill in the art would expect to have an effect on the solid solubility of B in Cr. Thus, the evidence of record is not sufficient to establish that the addition of B in an amount of less than 2 at% to the specific Cr alloy layers taught by Kanbe et al. would be understood by one of ordinary skill in the art to be taught away from by the prior art.

Advisory Action, pages 2-3, emphasis in original. Kanbe does teach a Cr alloy. See, for example, Kanbe col. 6, lines 43-45. However, for reasons stated below, the remarks contained in my earlier Declaration apply to the Cr alloys used as an underlayer by Kanbe.

3. Kanbe's Cr underlayer alloys are bcc alloys. (See Kanbe col. 6, line 43.) Bcc Cr alloys are very widely used as underlayers in magnetic disks to ensure that a subsequently deposited Co magnetic alloy layer nucleates and grows with a desired crystal orientation.. (See Application ¶0002.) In order to achieve this result, it is often desirable to alloy the Cr with another material (e.g. V, Mo or other materials as mentioned by Kanbe) to adjust (increase) the lattice spacing of the Cr bcc alloy to more closely match the lattice spacing of the Co alloy magnetic layer. If the lattice spacing of the Cr bcc alloy underlayer did not match the lattice spacing of the Co alloy magnetic layer, proper nucleation and growth of the Co alloy magnetic layer would be impaired. The information contained in this paragraph 3 is all very well known in the art.

4. One skilled in the art understands that a) the concentration of the additives listed by Kanbe are in an amount that would adjust the lattice spacing of the Cr but would not otherwise affect the bcc crystal structure of the underlayer; and b) these additives would not appreciatively affect the solid solubility of B in the underlayer. The underlayer is still predominantly Cr, and its properties are predominantly those of Cr.

5. Therefore, one skilled in the art would understand that adding B to a Cr alloy underlayer in an amount less than 2% (including the underlayer alloys taught by Kanbe), would not affect the crystallite size of the Cr underlayer or otherwise achieve the goals advocated by Kanbe.

6. Other companies in magnetic hard disk industry use Cr bcc alloys in their underlayers, including materials listed by Kanbe. During the course of my work at Komag, I have become knowledgeable concerning the practices of the other companies in the magnetic hard disk industry. None of these companies (to the best of my knowledge) add B to their Cr bcc underlayer alloys in an amount less than 2%. When they add B to the alloys they add the B in an amount not less than 2%.

7. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 USC 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Respectfully submitted,

Gerardo Bertero

Date: 9/21/06, 2006

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